

Air Quality Modeling Data Files for the
Regulatory Impact Analysis for the proposed action titled “Regulatory Impact Analysis for the Proposed
New Source Performance Standards for Greenhouse Gas Emissions from New, Modified, and
Reconstructed Fossil Fuel-Fired Electric Generating Units; Emission Guidelines for Greenhouse Gas
Emissions from Existing Fossil Fuel-Fired Electric Generating Units; and Repeal of the Affordable Clean
Energy Rule”
Docket EPA-HQ-OAR-2023-0072

This document describes the air quality modeling data files that were used for the Regulatory Impact Analysis for the Proposed New Source Performance Standards for Greenhouse Gas Emissions from New, Modified, and Reconstructed Fossil Fuel-Fired Electric Generating Units; Emission Guidelines for Greenhouse Gas Emissions from Existing Fossil Fuel-Fired Electric Generating Units; and Repeal of the Affordable Clean Energy Rule.

Information on the air quality modeling performed for this proposed rule including a description of the modeling domains, model inputs, emissions scenarios, contribution modeling, and results can be found in chapters 4 and 8 of the Regulatory Impacts Analysis.

The table below identifies three types of docketed air quality files used in this analysis.

File Type	Description
Source Apportionment IOAPI files	layer 1 gridded seasonal average ozone (8-hr daily maximum) and monthly average PM concentrations and source contributions ¹ from the 2026fj_egusa model runs using EPA’s 2016v2 emissions platform
SMAT-CE output files	SMAT-CE outputs (.csv) which contain eVNA spatial fields for ozone and PM _{2.5} and PM species fractions from the 2026fj_egusa model run
BenMAP input files	BenMAP input files (.csv) containing spatial fields of ozone and PM _{2.5} representing the baseline, proposed policy, and more stringent alternative policy for each analytic year

In addition to the copy in the docket, EPA will respond to specific requests for these data or requests for specific additional inputs and outputs from the modeling process, depending on the availability of those data.

Requests for electronic copies of the proposed rule air quality modeling data should be sent to Heather Simon (simon.heather@epa.gov).

Additional information on each of these file types is provided below.

¹source contributions for ozone are the 8-hour avg contributions for the time of the model-predicted MDA8 concentration in each grid cell.

Source Apportionment IOAPI Files:

The Apr-Sep seasonal average of 8-hr daily maximum (MDA8) ozone values are in the file named:

merge_osat_NOXVOC_O3_2026fj_egusa_16j_APRSEP_MDA8.ncf

The PM file names for monthly average PM_{2.5} are in the following format, where MM represents the 2-digit month: monthlyavg.LST.Y_24.12US2.2026fj_egusa_psat_16j_NH3Rscale0.MM.ncf

Ozone Source apportionment tags use the following naming convention where ST = state abbreviation²:

- O3_ALL_EGU: bulk O3 in the EGU tag run
- O3N_BIO_EGU: O3 contributions from biogenic NOx emissions in the EGU tag run
- O3N_ST_EGU: O3 contributions from EGU NOx emission in state, "ST"
- O3N_OTH_EGU: O3 contributions from NOx emissions from all sources other than biogenic and tagged EGUs in the EGU tag run
- O3V_BIO_EGU: O3 contributions from biogenic VOC emissions in the EGU tag run
- O3V_ST_EGU: O3 contributions from EGU VOC emissions in state, "ST"
- O3V_OTH_EGU: O3 contributions from VOC emissions from all sources other than biogenic and tagged EGUs in the EGU tag run
- O3NV_ICBC_EGU: O3 contributions from initial conditions and boundary conditions

PM source apportionment tags use the following naming convention where ST = state abbreviation and YYYY = PM component species

- BULK_YYYY: bulk PM specie YYYY
- BIOG_YYYY³: PM specie YYYY contribution from biogenic emissions sources
- ST_YYYY³: PM specie YYYY contribution from EGU emissions sources in state, "ST"
- TRIBAL_YYYY³: PM specie YYYY contribution from EGU emissions sources on tribal lands
- ALL_OTHER_YYYY³: PM specie YYYY contribution from emissions from sources other than EGUs and biogenic sources
- ICBC_YYYY³: PM specie YYYY contribution from initial and boundary conditions
- The following PM component species were included in the files
 - PM25: total PM_{2.5} mass
 - PSO4: fine sulfate
 - PNO3: fine nitrate
 - PNH4: fine ammonium (not used)
 - PEC: fine elemental carbon
 - POA: fine primary organic aerosol
 - SOA: fine secondary organic aerosol
 - PCL: fine particulate chloride
 - NA: fine sodium
 - FCRS: sum of particulate aluminum, calcium, iron, magnesium, potassium, manganese, silicon, and titanium
 - FPRM: all other unspciated fine particulate matter
 - CPRM: coarse crustal material (not used)

² Note that the two-letter abbreviation, "TL", stands for tribal lands

³ for all species except SOA, PCL, NA, PM25

SMAT-CE output files

- Ozone eVNA spatial field for 2026fj modeled case:
 - File name: 2026fj_egusa.MDA8.AprSep.Spatial_Field.csv
 - File fields:

Field Name	Description
_id	4 to 6 digit 12km grid cell ID
_type	blank field
lat	latitude in decimal degrees of the grid-cell center
long	Longitude in decimal degrees of the grid-cell center
date	last year of the 3-year monitoring data period used for eVNA calculation (2018 represents use of 2016-2018 monitoring data)
ga_conc	Modeled concentration (ppb) used for gradient adjustment
i_b_o3(eVNA)	base year (2016) Apr-Sep MDA8 O3 eVNA value
i_f_o3(eVNA)	future year (2026) Apr-Sep MDA8 O3 eVNA value
b_o3_model	base year (2016) Apr-Sep MDA8 O3 modeled value
f_o3_model	future year (2026) Apr-Sep MDA8 O3 modeled value
ppb	Lowest daily MDA8 O3 value in the grid-cell from Apr-Sep
days	Number of days included in the Apr-Sep MDA8 average O3 value
reference	same as “_id”
rrf	modeled relative response factor calculated as f_o3_model divided by b_o3_model

- PM eVNA spatial field for 2026fj modeled case:
 - File name: AnnualPM_2026fj_NH3Rscale0 Quarterly PM25 Spatial Field (eVNA).csv
 - File fields (base year refers to 2016 and future year refers to 2026):

Field Name	Description
_id	4 to 6 digit 12km grid cell ID
gridcell_lat	latitude of the grid-cell center
gricell_long	longitude of the grid-cell center
quarter	quarter of the year: 1 = Jan-Mar; 2 = Apr-Jun; 3 = Jul-Sep; 4 = Oct-Dec
b_pm25_ann_q_DV_ga	Base year 5 year weighted average eVNA PM2.5 (quarter) design value
f_pm25_ann_q_DV_ga	Future year 5 year weighted average eVNA PM2.5 (quarter) design value
b_blank_mass_q_ga	base year quarterly average eVNA filter blank adjustment ($\mu\text{g}/\text{m}^3$)
b_crustal_mass_q_ga	base year quarterly average eVNA crustal concentration
b_EC_mass_q_ga	base year quarterly average eVNA elemental carbon concentration
b_NH4_mass_q_ga	base year quarterly average eVNA particle-phase ammonium concentration
b_Ocmb_mass_q_ga	base year quarterly average eVNA organic carbon concentration calculated using mass-balance (by difference)
b_SO4_mass_q_ga	base year quarterly average eVNA sulfate ion concentration
b_NO3_mass_q_ga	base year quarterly average eVNA particle-phase nitrate ion concentration

b_water_mass_q_ga	base year quarterly average eVNA particle-bound water concentration
b_salt_mass_q_ga	base year quarterly average eVNA particle-phase salt concentration
f_blank_mass_q_ga	future year quarterly average eVNA filter blank adjustment
f_crustal_mass_q_ga	future year quarterly average eVNA crustal concentration
f_EC_mass_q_ga	future year quarterly average eVNA elemental carbon concentration
f_NH4_mass_q_ga	future year quarterly average eVNA particle-phase ammonium concentration
f_Ocmb_mass_q_ga	future year quarterly average eVNA organic carbon concentration calculated using mass-balance
f_SO4_mass_q_ga	future year quarterly average eVNA sulfate concentration
f_NO3_mass_q_ga	future year quarterly average eVNA particle-phase nitrate concentration
f_water_mass_q_ga	future year quarterly average eVNA particle-bound water concentration
f_salt_mass_q_ga	future year quarterly average eVNA particle-phase salt concentration
rff_crustal_q_ga	modeled relative response factor for quarterly average crustal particles calculated as f_crustal_mass_q_ga divided by b_crustal_mass_q_ga
rff_ec_q_ga	modeled relative response factor for quarterly average elemental carbon concentrations
rff_nh4_q_ga	modeled relative response factor for quarterly average particle-phase ammonium concentration
rff_oc_q_ga	modeled relative response factor for quarterly average organic carbon concentration
rff_so4_q_ga	modeled relative response factor for quarterly average sulfate concentration
rff_no3_q_ga	modeled relative response factor for quarterly average particle-phase nitrate concentration
rff_water_q_ga	modeled relative response factor for quarterly average particle-bound water concentration
rff_salt_q_ga	modeled relative response factor for quarterly average particle-phase salt concentration

- PM species fraction file:
 - File name: AnnualPM_2026fj_NH3Rscale0 Quarterly Avg Spec Frac Spatial Field (eVNA).csv
 - All PM data in this file are based on 5-year weighted averages of monitor data. No model data is included in this file.
 - File fields:

Field Name	Description
_id	4 to 6 digit 12km grid cell ID
gridcell_lat	latitude of the grid-cell center
gricell_long	longitude of the grid-cell center

quarter	quarter of the year: 1 = Jan-Mar; 2 = Apr-Jun; 3 = Jul-Sep; 4 = Oct-Dec
pm25_mass_frac_ga	quarterly average VNA PM2.5 mass
fcr_ga	Crustal mass fraction of quarterly average VNA PM2.5 mass
fec_ga	Elemental carbon mass fraction of quarterly average VNA PM2.5 mass
fnh4_ga	Ammonium mass fraction of quarterly average VNA PM2.5 mass
focm_ga	Organic carbon mass fraction of quarterly average VNA PM2.5 mass
fso4_ga	Sulfate mass fraction of VNA quarterly average PM2.5 mass
fno3_ga	Nitrate mass fraction of VNA quarterly average PM2.5 mass
fwater_ga	Water mass fraction of VNA quarterly average PM2.5 mass
fsalt_ga	Salt mass fraction of VNA quarterly average PM2.5 mass
blank_mass_ga	quarterly average VNA filter blank adjustment
don_ga	Degree of neutralization of sulfate used to calculate ammonium mass (0.000 - 0.375)
i_so4_ga	Interpolated sulfate ion concentration
i_no3r_ga	Interpolated reduced nitrate ion concentration includes an adjustment for volatilization from the FRM filter
i_ocb_ga	Interpolated blank-adjusted organic carbon concentration
i_ec_ga	Interpolated elemental carbon concentration
i_crustal_ga	Interpolated crustal concentration
i_don_ga	Interpolated degree of neutralization of sulfate (DON). Note that DON is not gradient-adjusted.
i_nh3_ga	Interpolated ammonium concentration
i_no3_ga	Interpolated nitrate ion concentration
i_salt_ga	Interpolated salt concentration

BenMAP input files:

- The following files are available for Apr-Sep seasonal average of MDA8 ozone:
 - basecase_2028_O3_MDA8_AprSep_BenMAP.input.csv: baseline scenario in 2028
 - basecase_2030_O3_MDA8_AprSep_BenMAP.input.csv: baseline scenario in 2030
 - basecase_2035_O3_MDA8_AprSep_BenMAP.input.csv: baseline scenario in 2035
 - basecase_2040_O3_MDA8_AprSep_BenMAP.input.csv: baseline scenario in 2040
 - run39c_2028_O3_MDA8_AprSep_BenMAP.input.csv: illustrative proposal scenario in 2028
 - run39c_2030_O3_MDA8_AprSep_BenMAP.input.csv: illustrative proposal scenario in 2030
 - run39c_2035_O3_MDA8_AprSep_BenMAP.input.csv: illustrative proposal scenario in 2035
 - run39c_2040_O3_MDA8_AprSep_BenMAP.input.csv: illustrative proposal scenario in 2040
 - run40c_2028_O3_MDA8_AprSep_BenMAP.input.csv: less stringent scenario in 2028
 - run40c_2030_O3_MDA8_AprSep_BenMAP.input.csv: less stringent scenario in 2030
 - run40c_2035_O3_MDA8_AprSep_BenMAP.input.csv: less stringent scenario in 2035
 - run40c_2040_O3_MDA8_AprSep_BenMAP.input.csv: less stringent scenario in 2040
 - run41c_2028_O3_MDA8_AprSep_BenMAP.input.csv: more stringent scenario in 2028
 - run41c_2030_O3_MDA8_AprSep_BenMAP.input.csv: more stringent scenario in 2030
 - run41c_2035_O3_MDA8_AprSep_BenMAP.input.csv: more stringent scenario in 2035
 - run41c_2040_O3_MDA8_AprSep_BenMAP.input.csv: more stringent scenario in 2040

- The following files are available for annual average PM_{2.5}
 - basecase_2028_PM25_BenMAP.input.csv: baseline scenario in 2028
 - basecase_2030_PM25_BenMAP.input.csv: baseline scenario in 2030
 - basecase_2035_PM25_BenMAP.input.csv: baseline scenario in 2035
 - basecase_2040_PM25_BenMAP.input.csv: baseline scenario in 2040
 - run39c_2028_PM25_BenMAP.input.csv: illustrative proposal scenario in 2028
 - run39c_2030_PM25_BenMAP.input.csv: illustrative proposal scenario in 2030
 - run39c_2035_PM25_BenMAP.input.csv: illustrative proposal scenario in 2035
 - run39c_2040_PM25_BenMAP.input.csv: illustrative proposal scenario in 2040
 - run40c_2028_PM25_BenMAP.input.csv: less stringent scenario in 2028
 - run40c_2030_PM25_BenMAP.input.csv: less stringent scenario in 2030
 - run40c_2035_PM25_BenMAP.input.csv: less stringent scenario in 2035
 - run40c_2040_PM25_BenMAP.input.csv: less stringent scenario in 2040
 - run41c_2028_PM25_BenMAP.input.csv: more stringent scenario in 2028
 - run41c_2030_PM25_BenMAP.input.csv: more stringent scenario in 2030
 - run41c_2035_PM25_BenMAP.input.csv: more stringent scenario in 2035
 - run41c_2040_PM25_BenMAP.input.csv: more stringent scenario in 2040